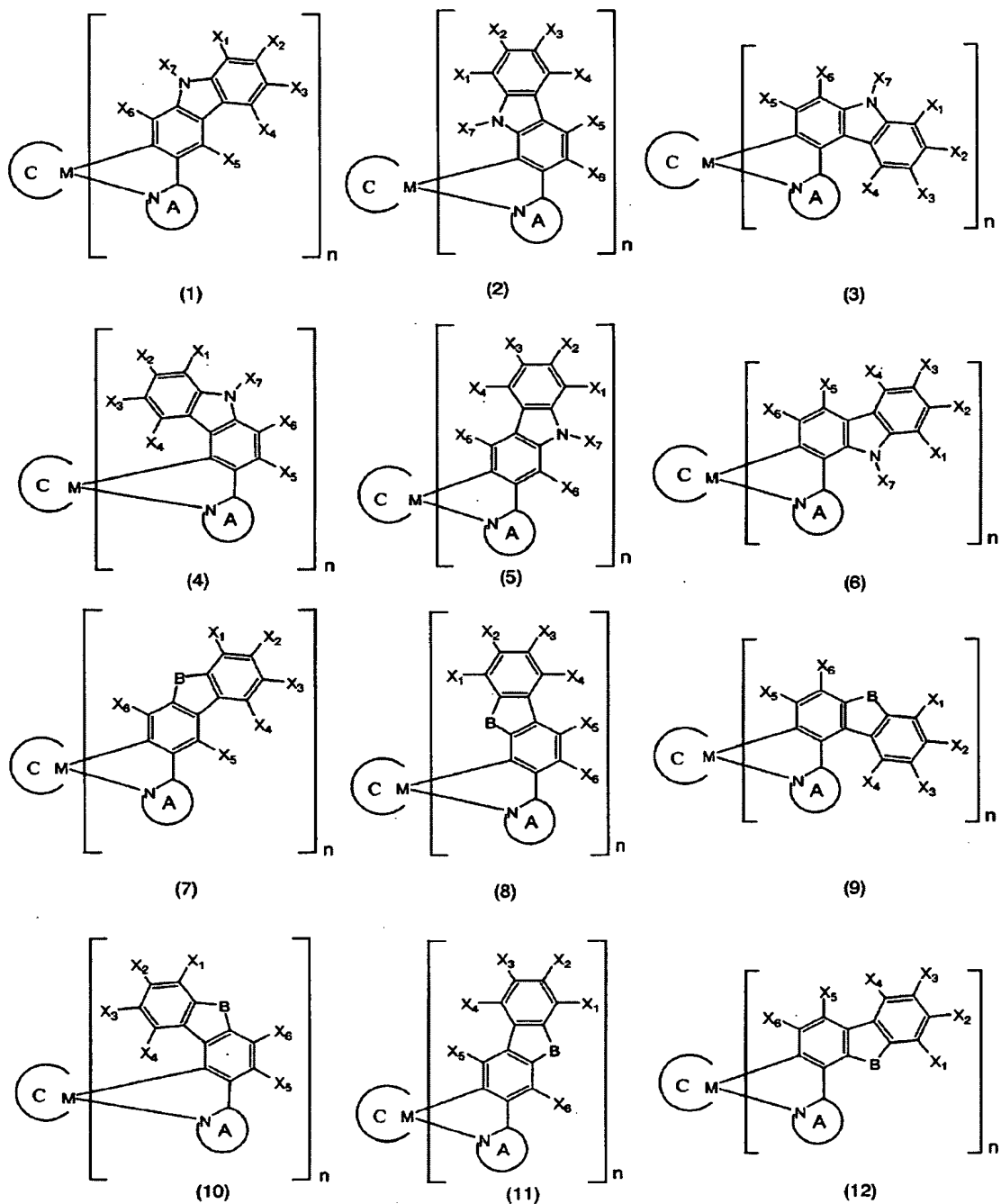


## Claims

1. A metal coordination compound-containing copolymer comprising:  
a metal coordination compound monomer unit represented by any one  
5 of Formulae (1) to (12),



B : >O, >S, >C=O, >SO<sub>2</sub>, >CR<sub>2</sub>

(in the formulae, M is Ir, Rh, Ru, Os, Pd, or Pt, and n is 1 or 2; ring A is a cyclic

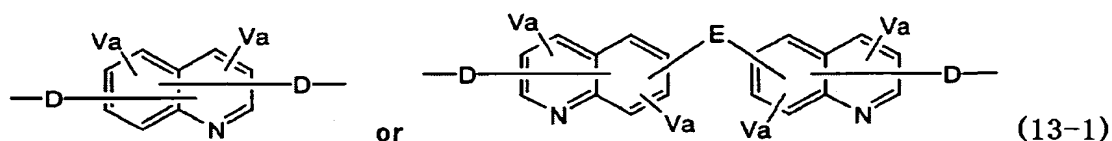
compound containing a nitrogen atom bonded to M;  $X_1$  to  $X_7$  and R are independently substituents selected from the group consisting of  $-R^1$ ,  $-OR^2$ ,  $-SR^3$ ,  $-OCOR^4$ ,  $-COOR^5$ ,  $-SiR^6R^7R^8$ , and  $-NR^9R^{10}$  (here,  $R^1$  to  $R^{10}$  are a hydrogen atom, a halogen atom, a cyano group, a nitro group, a C1 to C22 straight-chain, cyclic, or branched alkyl group or a corresponding halogen-substituted alkyl group in which a part or all of the hydrogen atoms are substituted by a halogen atom, a C6 to C30 aryl group, a C2 to C30 heteroaryl group, or a C7 to C30 aralkyl group, or a corresponding halogen-substituted aryl group, halogen-substituted heteroaryl group, or halogen-substituted aralkyl group, in which a part or all of the hydrogen atoms are substituted by a halogen atom, and  $R^1$  to  $R^{10}$  may be identical to or different from each other),  $X_1$  to  $X_7$  may be identical to or different from each other, and ring A may have a substituent that is the same as the groups defined by  $X_1$  to  $X_7$ ; ring C is a compound that is bonded to M and that bonds to a linking group; and ring C may have a substituent that is the same as the groups defined by  $X_1$  to  $X_7$ ); and

at least one type of monomer unit selected from the group consisting of a substituted or unsubstituted quinoline monomer unit, a substituted or unsubstituted arylene and/or heteroarylene monomer unit, a substituted or unsubstituted branched monomer unit, and a substituted or unsubstituted conjugated monomer unit.

2. The metal coordination compound-containing copolymer according to Claim 1, wherein the copolymer comprises

a metal coordination compound monomer unit represented by any one of the Formulae (1) to (12),

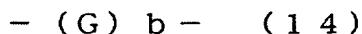
a substituted or unsubstituted quinoline monomer unit represented by Formulae (13-1),



(in the formulae, a plurality of  $V$  are independently substituents selected from the group consisting of  $-R^1$ ,  $-OR^2$ ,  $-SR^3$ ,  $-OCOR^4$ ,  $-COOR^5$ , and  $-SiR^6R^7R^8$  (here,  $R^1$  to  $R^8$  are a C1 to C22 straight-chain, cyclic, or branched alkyl group, or a C2 to C30 aryl or heteroaryl group), may be identical to or different from each other, and are bonded to a substitutable position of a quinoline residue, and each  $a$  is independently an integer of 0 to 3;  $D$  is selected from the group consisting of a single bond and arylene; and  $E$  is a divalent linking group selected from the group consisting of a single bond,  $-O-$ ,  $-S-$ ,  $-C(O)-$ ,  $-S(O)-$ ,  $-S(O_2)-$ ,  $-W-$ ,  $-(-O-W-)_m-O-$  ( $m$  is an integer of 1 to 3), and  $-Q-$  [in the formulae,  $W$  is a divalent group selected from the group consisting of  $-Ra-$ ,  $-Ar'-$ ,  $-Ra-Ar'-$ ,  $-Ra'-O-Ra'-$ ,  $-Ra'-C(O)O-Ra'-$ ,  $-Ra'-NHCO-Ra'-$ ,  $-Ra-C(O)-Ra-$ ,  $-Ar'-C(O)-Ar'-$ ,  $-Het'-$ ,  $-Ar'-S-Ar'-$ ,  $-Ar'-S(O)-Ar'-$ ,  $-Ar'-S(O_2)-Ar'-$ , and  $-Ar'-Q-Ar'-$ ;  $Ra$  is alkylene,  $Ar'$  is arylene, each  $Ra'$  is independently a group selected from the group consisting of alkylene, arylene, and a mixed alkylene/arylene group,  $Het'$  is heteroarylene, and  $Q$  is a divalent group containing a quaternary carbon)], and

a substituted or unsubstituted arylene and/or heteroarylene monomer unit,

the monomer units each being bonded via a linking group represented by Formula (14),

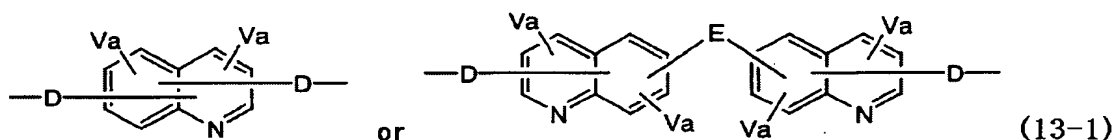


(in the formula, G is a divalent group selected from the group consisting of -O-, -R-O-R-, -S-, -NR-, -CR<sub>2</sub>-, -SiR<sub>2</sub>-, -SiR<sub>2</sub>-O-SiR<sub>2</sub>-, and -SiR<sub>2</sub>-O-SiR<sub>2</sub>-O-SiR<sub>2</sub>- (here, R is a C1 to C22 straight-chain, cyclic, or branched alkyl group, or a C2 to C30 aryl or heteroaryl group), and b is an integer of 0 or 1).

3. The metal coordination compound-containing copolymer according to Claim 1, wherein the copolymer comprises

a metal coordination compound monomer unit represented by any one of the Formulae (1) to (12),

a substituted or unsubstituted quinoline monomer unit represented by Formulae (13-1),

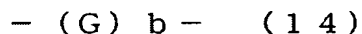


(in the formulae, a plurality of V are independently substituents selected from the group consisting of -R<sup>1</sup>, -OR<sup>2</sup>, -SR<sup>3</sup>, -OCOR<sup>4</sup>, -COOR<sup>5</sup>, and -SiR<sup>6</sup>R<sup>7</sup>R<sup>8</sup> (here, R<sup>1</sup> to R<sup>8</sup> are a C1 to C22 straight-chain, cyclic, or branched alkyl group, or a C2 to C30 aryl or heteroaryl group), may be identical to or different from each other, and are bonded to a substitutable position of a quinoline residue, and each a is independently an integer of 0 to 3; D is selected from the group consisting of a single bond and arylene; and E is a divalent linking group

selected from the group consisting of a single bond, -O-, -S-, -C(O)-, -S(O)-, -S(O<sub>2</sub>)-, -W-, -(-O-W)<sub>m</sub>-O- (m is an integer of 1 to 3), and -Q- [in the formulae, W is a divalent group selected from the group consisting of -Ra-, -Ar'-, -Ra-Ar'-, -Ra'-O-Ra'-, -Ra'-C(O)O-Ra'-, -Ra'-NHCO-Ra'-, -Ra-C(O)-Ra-, -Ar'-C(O)-Ar'-, -Het'-, -Ar'-S-Ar'-, -Ar'-S(O)-Ar'-, -Ar'-S(O<sub>2</sub>)-Ar'-, and -Ar'-Q-Ar'-; Ra is alkylene, Ar' is arylene, each Ra' is independently a group selected from the group consisting of alkylene, arylene, and a mixed alkylene/arylene group, Het' is heteroarylene, and Q is a divalent group containing a quaternary carbon)], and

a substituted or unsubstituted branched monomer unit,

the monomer units each being bonded via a linking group represented by Formula (14),

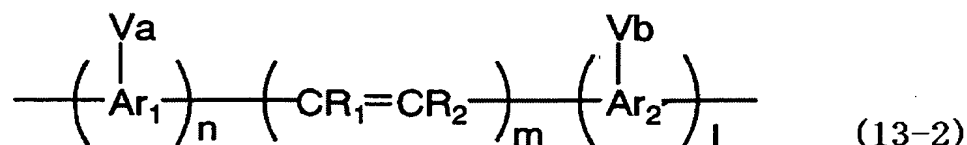


(in the formula, G is a divalent group selected from the group consisting of -O-, -R-O-R-, -S-, -NR-, -CR<sub>2</sub>-, -SiR<sub>2</sub>-, -SiR<sub>2</sub>-O-SiR<sub>2</sub>-, and -SiR<sub>2</sub>-O-SiR<sub>2</sub>-O-SiR<sub>2</sub>- (here, R is a C1 to C22 straight-chain, cyclic, or branched alkyl group, or a C2 to C30 aryl or heteroaryl group), and b is an integer of 0 or 1).

4. The metal coordination compound-containing copolymer according to Claim 1, wherein the copolymer comprises

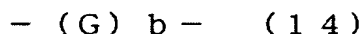
a metal coordination compound monomer unit represented by any one of the Formulae (1) to (12), and

a substituted or unsubstituted conjugated monomer unit represented by Formula (13-2),



(in the formula, Ar<sub>1</sub> and Ar<sub>2</sub> are divalent arylene and/or heteroarylene; a plurality of V, and R<sub>1</sub> and R<sub>2</sub>, are independently substituents selected from the group consisting of -R<sup>1</sup>, -OR<sup>2</sup>, -SR<sup>3</sup>, -OCOR<sup>4</sup>, -COOR<sup>5</sup>, and -SiR<sup>6</sup>R<sup>7</sup>R<sup>8</sup> (here, R<sup>1</sup> to R<sup>8</sup> are a C1 to C22 straight-chain, cyclic, or branched alkyl group, or a C2 to C30 aryl or heteroaryl group), may be identical to or different from each other, and are bonded to a substitutable position of an arylene or heteroarylene residue, and a and b are independently an integer of 0 or greater; R<sub>1</sub> and R<sub>2</sub> may independently be a hydrogen atom; n, m, and l are independently 0 or 1, and n, m, and l are not simultaneously 0),

the monomer units each being bonded via a linking group represented by Formula (14),

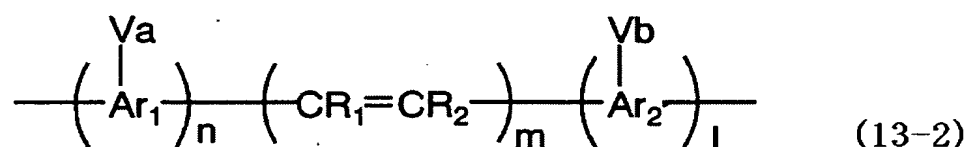


(in the formula, G is a divalent group selected from the group consisting of -O-, -R-O-R-, -S-, -NR-, -CR<sub>2</sub>-, -SiR<sub>2</sub>-, -SiR<sub>2</sub>-O-SiR<sub>2</sub>-, and -SiR<sub>2</sub>-O-SiR<sub>2</sub>-O-SiR<sub>2</sub>- (here, R is a C1 to C22 straight-chain, cyclic, or branched alkyl group, or a C2 to C30 aryl or heteroaryl group), and b is an integer of 0 or 1).

5. The metal coordination compound-containing copolymer according to Claim 1, wherein the copolymer comprises

a metal coordination compound monomer unit represented by any one of the Formulae (1) to (12),

a substituted or unsubstituted conjugated monomer unit represented by Formula (13-2),



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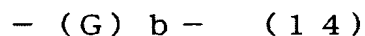
(in the formula, Ar<sub>1</sub> and Ar<sub>2</sub> are divalent arylene and/or heteroarylene; a plurality of V, and R<sub>1</sub> and R<sub>2</sub>, are independently substituents selected from the group consisting of -R<sup>1</sup>, -OR<sup>2</sup>, -SR<sup>3</sup>, -OCOR<sup>4</sup>, -COOR<sup>5</sup>, and -SiR<sup>6</sup>R<sup>7</sup>R<sup>8</sup> (here, R<sup>1</sup> to R<sup>8</sup> are a C1 to C22 straight-chain, cyclic, or branched alkyl group, or a C2 to C30 aryl or heteroaryl group), may be identical to or different from each other, and are bonded to a substitutable position of an arylene or heteroarylene residue, and a and b are independently an integer of 0 or greater; R<sub>1</sub> and R<sub>2</sub> may independently be a hydrogen atom; n, m, and l are independently 0 or 1, and n, m, and l are not simultaneously 0), and

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a substituted or unsubstituted branched monomer unit,

the monomer units each being bonded via a linking group represented by Formula (14),



(in the formula, G is a divalent group selected from the group consisting of -O-,

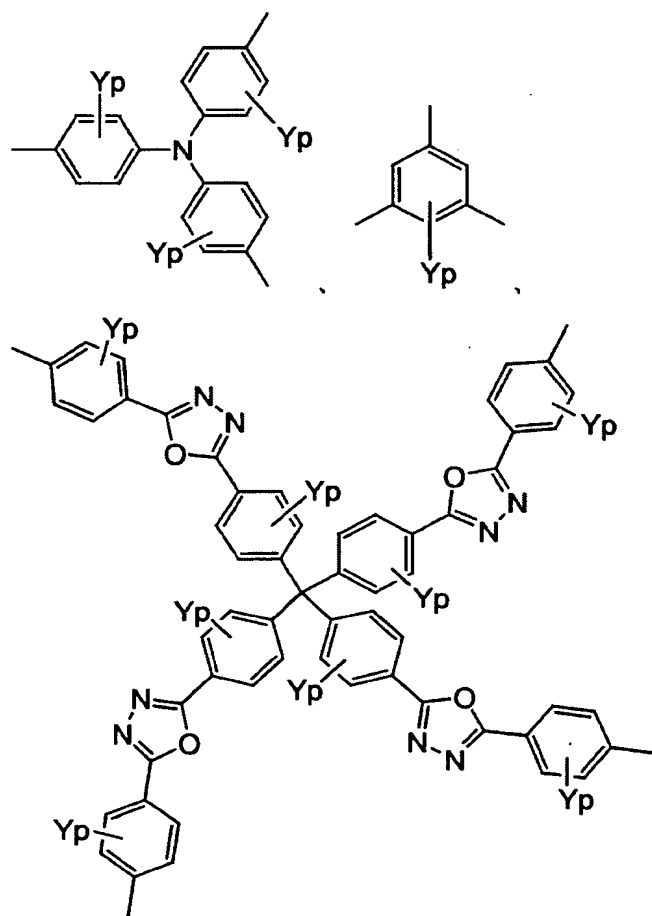
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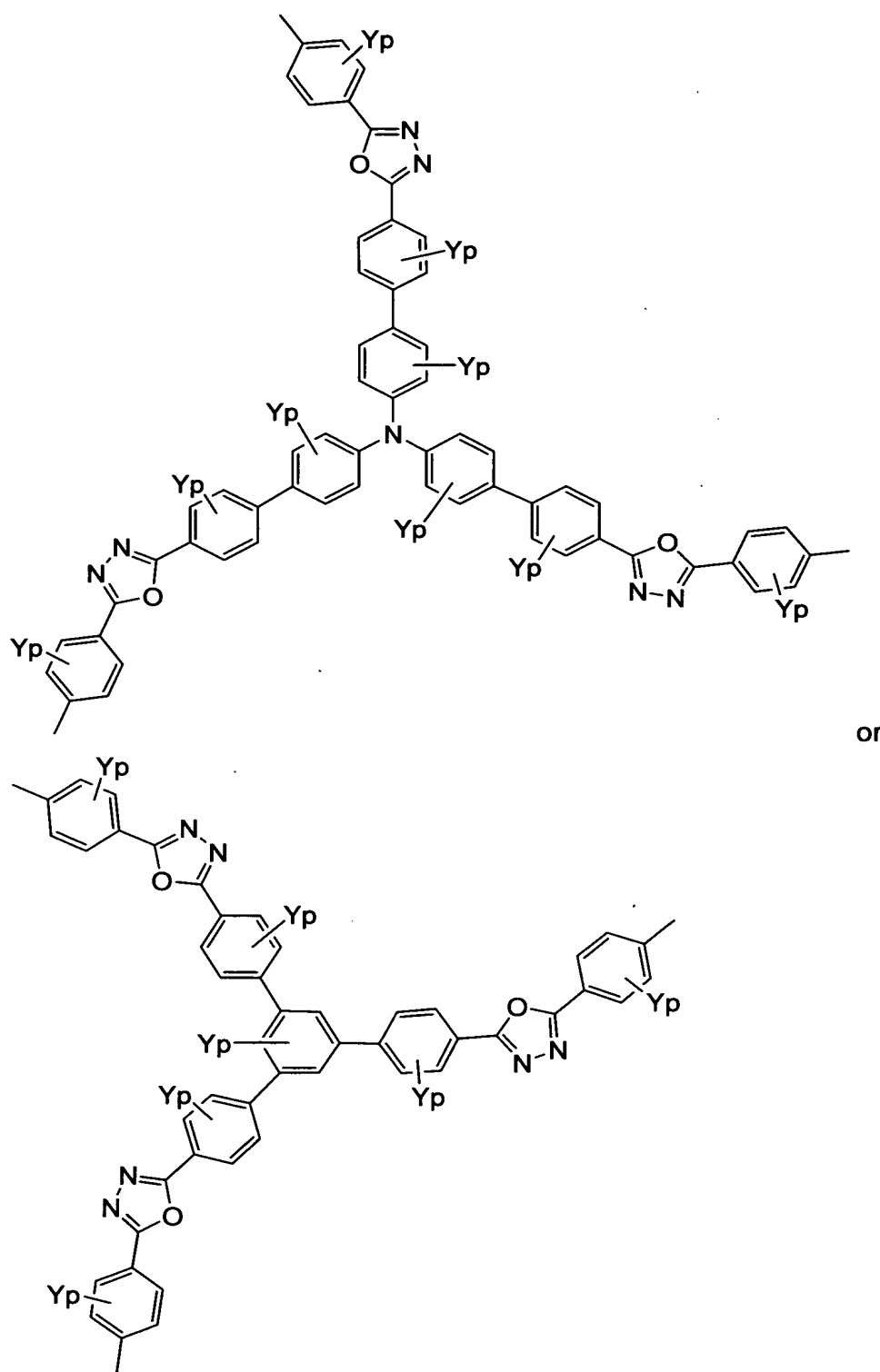
-R-O-R-, -S-, -NR-, -CR<sub>2</sub>-, -SiR<sub>2</sub>-, -SiR<sub>2</sub>-O-SiR<sub>2</sub>-, and -SiR<sub>2</sub>-O-SiR<sub>2</sub>-O-SiR<sub>2</sub>-



(here, R is a C1 to C22 straight-chain, cyclic, or branched alkyl group, or a C2 to C30 aryl or heteroaryl group), and b is an integer of 0 or 1).

6. The metal coordination compound-containing copolymer according to  
 5 any one of Claims 1, 3, and 5, wherein the substituted or unsubstituted  
 branched monomer unit is a branched monomer unit selected from the group  
 consisting of Formulae (15):





(in the formulae, a plurality of Y are substituents selected from the group

consisting of  $-R^1$ ,  $-OR^2$ ,  $-SR^3$ ,  $-OCOR^4$ ,  $-COOR^5$ , and  $-SiR^6R^7R^8$  (here,  $R^1$  to  $R^8$  are a C1 to C22 straight-chain, cyclic, or branched alkyl group, or a C2 to C30 aryl or heteroaryl group), may be identical to or different from each other, and are bonded to a substitutable position of a benzene ring having a branched skeleton, and  $p$  is an integer of 0 to 4).

7. The metal coordination compound-containing copolymer according to any one of Claims 1 to 6, wherein in the Formulae (1) to (12) ring A is pyridine, quinoline, benzoxazole, benzothiazole, benzimidazole, benzotriazole, imidazole, pyrazole, oxazole, thiazole, triazole, benzopyrazoletriazine, or isoquinoline, which may have a substituent that is the same as the groups defined by  $X_1$  to  $X_7$ .

8. The metal coordination compound-containing copolymer according to any one of Claims 1 to 7, wherein in the Formulae (1) to (12) at least one of  $X_1$  to  $X_7$  and the substituent of ring A defined as being the same as  $X_1$  to  $X_7$  is a fluorine atom or a trifluoromethyl group.

9. The metal coordination compound-containing copolymer according to any one of Claims 1 to 8, wherein in the Formulae (1) to (12) M is iridium.

10. A polymer composition comprising the metal coordination compound-containing copolymer according to any one of Claims 1 to 9 and a conjugated or non-conjugated polymer.

11. An organic electroluminescent device fabricated using the metal coordination compound-containing copolymer according to any one of Claims 1 to 9 or the polymer composition according to Claim 10.